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ABSTRACT

As part of a project investigating how communication within hospital systems differs from communication in other types of organizations, the employees of a 40-bed hospital were surveyed for their attitudes on perceived uncertainty, internal patterns of communication in the hospital, and worker satisfaction. Variables that were studied included message, channel, and source uncertainty; demographic variables; role description variables; and worker satisfaction. The results of the study revealed that, (1) similar to other organizations satisfaction was significantly correlated with task, human, and maintenance message uncertainty. Human uncertainty accounted for the largest amount of the variance in satisfaction, nearly 17%. (2) The hospital used in the case study was different from the other organizations analyzed in that there appeared to be problems involving written channels and immediate supervisors. (3) Sex was the only demographic variable that correlated with satisfaction, and none of the role descriptions appeared to play a significant part in explaining satisfaction. (A copy of the Communication Analysis Questionnaire is appended.) (Author/RL)

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AN ANALYSIS OF UNCERTAINTY AND SATISFACTION:

A HOSPITAL CASE STUDY

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An Analysis of Uncertainty and Satisfaction:
A Hospital Case Study

Introduction

Organizational communication research may be described by noting four features of that research (Downs, 1976; Salem, 1977). First, most research investigates internal instead of external communication. Secondly, research seems focused at a microscopic level, exploring already established interpersonal, group and/or public theoretical relationships in an organizational context. Third, research methods have primarily employed questionnaire and/or interview techniques for measurement. Fourth, research tends to be atheoretical, developed out of pragmatic concerns and not aimed at theory building. Organizational communication is not yet a discipline, and, as a field of study, contains bits and pieces of data that resist generalization.

Hospital communication research has been described in a similar fashion. Georgopoulus (1975) described similar trends across all hospital research, and Hite and Hite (1977) found so few examples of rigourous hospital communication research in the journals that they limited themselves to a review of doctoral dissertations. The review recently provided by Costello and Pettegrew (1979) is the latest attempt at describing a fragmented domain.

One way to overcome the limitations of this literature is to model hospitals as information systems (Miller, 1978). According to this perspective, a hospital is viewed as a complex system which is multi-goal directed, bound together by information which integrates the various elements of the organization. Of central concern to an information approach are concepts such as information, uncertainty (i.e. the difference between information personnel have and the information they need), ways to reduce certain types of uncertainty, sources of uncertainty, and the relationship between uncertainty and satisfaction and/or performance. Using an information systems

model, hospitals can be viewed as an integrated set of subsystems possessing many of the same qualities of other social systems.

The Information Environments of Hospitals

In an interpersonal social system communicators construct messages to have meaning within a relationship (Pearce, 1976, pp. 1-7). When people are communicating with each other, the various messages become interdependent (Berlo, 1960, pp. 106-121) as part of an overall episode (Pearce and Conklin, 1979), and as message interdependence increases within an episode it reflects the influence potential of the relationship (Morton, Alexander and Altman, 1976). One communicator does not influence another directly but only through a relationship and only by constructing messages which are relationally meaningful as part of an episode (Salem, 1980).

Organizations are contrived systems of role relationships, and individuals partially include themselves in the system by supplying only those inputs and messages which are meaningful within the relationship (Katz and Kahn, 1978, pp. 46-47). An organization maintains itself by returning portions of its output to the individuals that fill roles to insure the further production of inputs into the system. Organizational communication is similar to interpersonal communication in that the same sets of variables (communicator, message, relationship and episode) and the same relationships between these sets are common to both social systems (Gratz and Salem, 1981).

Hospitals, similar to any organization, are socio-technical systems (Pasmore and Sherwood, 1978) where social processes and technological processes act as constraints on each other (Pasmore, Srivastva and Sherwood, 1978). One would, for example, expect hospitals' communicative behavior to be quite different from industrial communicative behavior because the technologies are different. One would also expect the type of health care to

be quite different if two hospitals employed radically different types of communicative behavior.

In most cases, the technological constraint is evidenced by the type and/or volume of information being processed, and so the analysis moves from a consideration of "technology" to a consideration of "information environments" (Emery and Trist, 1965). To review the salient features of hospital technology is to describe the information environments of hospitals.

The primary objective of hospitals is to provide personalized care to individual patients and, as a result, the majority of work in health care cannot be standardized or preplanned (Georgopoulus, 1978). It is not that some informal procedures for a given instance are not available, but that the nature of the instance cannot be planned. Diagnosis precedes treatment and the particular diagnostic procedure varies with the condition of the patient. Therapy is ultimately contingent on the nature of and the actions of the patient.

Patient therapy units of general service hospitals exist in a turbulent information environment. Diagnosis may be seen as the culling of data to allow diagnosticians to cognitively move through an elaborate decision tree to label the patient's condition, and then to move through several other trees to match the condition's label with a label for treatment. Although the actual treatment of the patient may appear routine, the redundancy of the behavior is dependant on the continued monitoring of patient data which may signal an abrupt turn to a different branch of a decision tree (Leigh, Weiland and Anderson, 1971).

The turbulence in patient therapy must be contrasted to the information environments of other subsystems of a hospital. An administrator's receptionist, part of what Garrett (1973) called the service subsystem, lives in a comparatively placid randomized environment which allows the individual

filling that role to improvise behavior within the social stereotype of the position (Johnson, 1977). Any sort of socially accepted greeting is appropriate while any sort of socially accepted diagnostic procedure is not. Hospitals exist in many varied information environments.

The responses to the different environments also vary. Specialization is the response to the information demands in patient therapy since, given the state of the art, the load of medical information and the number of diagnostic and treatment decisions is too great for one person to handle (Georgopoulus, 1978). Clerks and receptionists, on the other hand, are trained in some basic skills and generally could move freely from positions in one office to another with little extra training, indicating the small degree of specialization in that subsystem. Maintenance, building, supply and management subsystems normally contain levels of specialization in-between the two extremes.

The type of supervision also varies as a response to the information environment. In patient therapy, there is a low tolerance for ambiguous information and error that lends itself to close supervision (Georgopoulus, 1978). Again, this differs significantly from the more moderate styles generally employed in other units.

Of special interest is the management subsystem itself. Those involved with policy management must set rules for patient therapy, a subsystem which resists rules. What is more the administrator, normally not a medical professional, must find a way to make rules for the medical professionals that are employed by the hospital. No one could reasonably be expected to know all of the specialized medical areas that are part of patient therapy in a contemporary hospital, and the professional status of subordinates prohibits a heavy handed approach to administration.

The administrator is free to manage definitions. That is, formal role

definitions may be constructed, constrained by the societal definitions of the major roles of physicians and nurses. Management may set limits on the type and amount of interaction between roles and even encourage or limit some approaches to therapy, but in the end, the actual medical care of the patient relies on the skill and expertise of the medical professional. Management must assume that when it can place "licensed" or "registered" staff together with various "certified" material that medicine will take place. Hospitals are loosely-structured systems, similar to universities, entering personnel and materials that meet the definitions, providing the means and services for actual care, and coordinating the various specialized units (Meyer, 1975).

High specialization and competing professional interests are common organizational features which encourage conflict (Katz, 1976). Although conflict in and of itself is not harmful, the close supervision and limited interaction do not encourage the interpersonal relationships that may remove the negative aspects of conflict. Health care professionals may be noted for their self-reliance and independence, but in a hospital cooperation and a healthy social climate must be the norm if the functionally interdependent units are to be focused on the task. Georgopoulus (1978) notes this when he writes:

> Adequate organizational coordination . . . cannot be achieved and maintained on the basis of hierarchiacal authority and rational controls . . . It also depends very greatly. . . upon the voluntary and spontaneous adjustments which organizational groups and members are able and willing to make in order to accomodate one another and mutually facilitate their role performance in daily work. A great deal depends upon . . . the degree to which the work-relevant expectations, attitudes, motivations, and values of members in related jobs are congruent or complementary; the degree to which interacting groups and individuals are guided by informal norms of reciprocity, trust, and mutual helpfulness . . . (pp. 59-60).

Uncertainty and Satisfaction

Uncertainty is an inability to predict outcomes (Galbraith, 1977, pp. 36). In a purely objective sense, uncertainty increases as a function of the complexity of the circumstances warranting prediction (Galbraith, 1977, pp. 38-39). One might argue that, for example, the role of a nurse is more complex than that of a clerk, and therefore, there is more uncertainty in the first and less in the second.

Uncertainty may also be viewed as a perception not inherent in, but only constrained by, a circumstance. Uncertainty is seen as more a function of a person's perceptual inability to predict and less a function of the object of perception (Galbraith, 1977, pp. 38-39). An experienced nurse, for example, may experience less doubt than the inexperienced clerk.

Uncertainty is tautologically linked to information since information is often defined as a stimulus or message which reduces uncertainty (Farace, Monge and Russell, 1977, p. 24). A need for information is an expression of uncertainty, and the extent to which an organization can supply needed information is the extent to which it reduces uncertainty. If an organization does not supply all that is needed, the remaining need is uncertainty.

The literature on information environments may also be viewed as literature about uncertainty. In a placid information environment uncertainty is low, and the amount of information that is needed can normally be processed simply. In a turbulent environment, uncertainty is high and requires complex information processing to avoid organizational fragmentation.

Organizational dysfunction in a hospital seldom arises from poor task performance. Consistently poor task performance is, rather, a symptom of the system's collapse. Social dysfunction precedes technological dysfunction. Personnel become dissatisfied, distrustful, and uncooperative, making task

coordination difficult (Kingdon, 1973, pp. 105-108).

A worker's dissatisfaction is related to the information flow within an organization. Initially, enough information may not be supplied about the role responsibilities and expectations of a job. This role ambiguity begets dissatisfaction. An individual may be placed in a position that requires multiple responsibilities that appear mutually exclusive, and this role conflict may also create personal dissatisfaction. The more a role requires responsibility for the work of others, necessitates coordinating activities with others, requires innovative solutions, and the translation of information from and to differing technical specialties, the greater is the potential for uncertainty (Kingdon, 1973, pp. 65-67). Hospitals exist in just such an environment, and if the organization cannot supply the needed information, the resultant uncertainty should produce dissatisfaction.

The study reported in this paper is the first step in a project to assemble data in order to detect trends across hospitals and how communication within hospital systems differs from communication in other types of organizations. More specifically, the primary purpose of this study was to analyze the communication behavior in a small community hospital and to answer questions about information and uncertainty such as: what types of information are most needed by hospital personnel? what types of information are most often communicated? what channels are most likely to supply the information needed? and what sources of information are most likely to supply the information needed? Using primarily perceptual and attitudinal data, this research sought to predict employee satisfaction from several communication, demographic, and role relationship variables. Finally, a secondary concern was to compare the results of this hospital communication

study with the International Communication Association Communication Audit data bank norms as well as other audits conducted in various types of organizations. Such an analysis should help clarify how hospitals are similar to other kinds of organizations as well as index how hospital communication systems are distinguishably different.

Methods

The hospital analyzed in this study was a small community hospital in south central Texas. It employed approximately 200 persons and provided a variety of patient care services including an emergency room, surgery and intensive care unit, labor and delivery facilities, laboratory, radiology unit, respiratory therapy, and ambulance services. The hospital contained 40 beds and maintained a 90% occupancy.

The hospital administrator was contacted to discuss the feasibility of conducting a communication analysis of the hospital. Upon receiving permission to do the research, arrangements were made as to when and where the data would be drawn, a letter announcing the study was composed and sent to personnel in the hospital, and a list of the names of all the employees was obtained. In addition, a rough draft of the questionnaire was discussed with key individuals in the hospital in an effort to get feedback on certain questions to see if they were appropriate for this hospital.

The questionnaire consisted of two parts. The first part asked questions about information employees needed and received, the channels of communication, sources of information, and the satisfaction with the organization. The second part contained demographic questions and a communication network form. While the network analysis may produce interesting findings, the results are incomplete and were not included in this paper. (See the Appendix for the questionnaire analyzed in this study.)

The scales used in the present study were taken primarily from items appearing on the ICA Communication Audit. Some items were adjusted so that the wording would be appropriate for a hosptial, and other items were added; however, the basic format of the questionnaire was the same as that used in the ICA Communication Audit. The "Information Scale" consisted of 18 "need" items (which asked employees how much information they needed to perform their job well) and 18 "now" items (which asked them how much information they were presently receiving). For each of the "need" items there was an identically worded "now" item. An "uncertainty" score was obtained by subtracting the "need" item from the corresponding "now" item. Therefore, a negative score indicated a lack of information and uncertainty, a positive score indicated redundancy or too much information, and a score approaching zero indicated employees were receiving the information they needed.

The types of messages that are sent in organizations have typically been classified as task, human, and maintenance messages (Goldhaber, 1979). Following this precedent, the "Information Scale" was designed to contain three sub-scales of task, human, and maintenance information. The six items concerned with task information dealt with issues such as "my job responsibilities" and "how to actually perform my job." "Promotion and bonuses" and "how I am being evaluated" are examples of the six items concerned with human information. Finally, the six items addressing maintenance information dealt with issues such as "organizational goals and objectives" and "organizational policies." (See Table 1 for the items included on each sub-scale.)

For each of the three types of information, an overall uncertainty score was computed which ranged from -4 to +4. The task uncertainty score indicated the amount of uncertainty about task or job related information, the human

uncertainty score indicated the amount of uncertainty about personal concerns such as pay, benefits, or evaluation, and the maintenance uncertainty score indicated the amount of uncertainty about organizational policy or organization-wide information.

The "Channels of Communication Scale" contained 11 items and was concerned with the mode through which employees received information. Included were channels such as memos or letters, one-to-one conferences, staff meetings, telephone, bulletin boards, and newsletters. Following the same procedure used with the "Information Scale," the "Channels of Communication Scale" asked how much information needed to be received through certain channels and how much was actually received. Using the "need" and "now" scores, an uncertainty score ranging from -4 to +4 was computed for each channel item. The uncertainty score for each item indicated the difference between how much employees felt they needed information through that channel and the amount of information they were presently receiving through that channel. For this scale there was no overall channel uncertainty score since each item was analyzed individually. (See Table 1 for the channel items.)

The "Sources of Information Scale" contained 7 items and was designed to determine the person or source from whom employees received information. Co-workers in the same work unit, individuals outside their work unit, the immediate supervisor, and the grapevine were some of the sources included on the scale. Like the "Information Scale" and "Channels of Communication Scale," the "Sources of Information Scale" asked how much information employees needed to receive from certain sources and how much information they actually received from these sources. Using the "need" and "now" scores, an uncertainty score ranging from -4 to +4 was computed for each source item. Like the "Channels of Communication Scale," there was no overall sources uncertainty score since each item was analyzed individually. (See

Table 1 for source items.)

The "Satisfaction Scale" (labeled the "Opinion Form" on the questionnaire) measured the employees satisfaction with a variety of types of concerns in the organization. The scale contained 26 items, and in addition to using the overall scale ("Overall Satisfaction Scale"), it was divided into five sub-scales. The "Satisfaction with Work Scale" contained five items and was concerned with issues such as working conditions and satisfaction with the job. The "Satisfaction with Co-Workers Scale" contained six items and measured the employees' satisfaction with fellow workers. The "Satisfaction with the Organization Scale" included six items and assessed the degree of satisfaction with the organization's rules, policies, and overall effectiveness. The "Satisfaction with Supervisor Scale" contained five items and was concerned with how much employees liked and trusted their immediate supervisor. Finally, the "Satisfaction with Rewards Scale" contained four items and measured the satisfaction with the organizational benefits, promotion opportunities, and advancement possibilities. Subjects responded to a five point scale ranging from "Strongly Agree" (5) to "Strongly Disagree" (1) for each of the satisfaction items. (See Table 1 for the items included on the satisfaction scales.)

The "Demographic Scale" gathered basic demographic data including sex, work unit, job title, how long employees had worked in the organization, education, and age (See Appendix). In addition, information concerning the work shift of personnel and their level of supervision was also gathered.

The questionnaires were administered to all the hospital employees in two days in the latter part of August, 1981. Employees were instructed by their departmental managers to come to the education center at the end of their work shift on the designated days. Packets which were prepared for each person were distributed as individuals arrived. The purpose of the study was explained and employees were assured that their responses would remain anonymous. The instructions to the questionnaire were read, and questions about

the study were answered. Subjects were given the option of filling out the questionnaire at that time or completing the questionnaire at home and returning it the next day. Persons who did not attend the meeting where the questionnaires were distributed were contacted by their departmental manager the next day. The manager gave these employees their questionnaire and encouraged them to participate in the study. Questionnaires that were returned within a one week time period after distribution were included in the analysis.

Results

All of the hospital employees were selected for analysis in this study. Of the 175 questionnaires that were distributed 112 were returned and deemed acceptable for analysis. This constituted a response rate of 64%.

An analysis of the demographic results reveals the basic profile of the hospital employees and the nature of their role relationships within the hospital. The majority of the workers were female (77%) rather than male (23%). The results also indicated the following percentages for the various age groupings: under 20 (3%), 21 to 25 (22%), 26 to 30 (17%), 31 to 35 (10%), 36 to 40 (11%), 41 to 45 (12%), 46 to 50 (6%), 51 to 55 (8%), 56 to 60 (6%), over 60 (5%). Sixteen percent had less than a high school education, 9% had graduated from high school, 41% had some college course work, 24% had completed a four year college, 5% had taken some graduate work, and 5% had completed a Master's Degree.

Role relationship results revealed that most employees worked full-time (85%) instead of part-time (15%). The majority of the respondents worked on the day shift (56%), with 17% working on the afternoon shift, 8% working on the night shift, and 19% working on some form of rotational basis. In terms of level supervision, 80% did not supervise anyone, 8% were supervisors,

9% were departmental managers, and 3% were in top administration. Job tenure results (i.e. how long employees had worked for the organization) revealed that 27% had worked for the hospital less than 1 year, 24% had worked 1 to 2 years, 20% had worked 2 to 4 years, 14% had worked 4 to 10 years, and 15% had worked 10 to 24 years.

Finally, employees were assigned to subsystems based on their job function using a category system developed by Garrett (1973). Fifty-three percent were in the "Therapy" subsystem (e.g. nurses, medical technicians), 21% were in the "Service" subsystem (e.g. clerks, secretaries, housekeeping), 10% were in the "Supply" subsystem (e.g. sterile supplies, dietary, pharmacy), 4% were in the "Financial Management" subsystem (e.g. accounting, patient business), and 12% were in the "Policy Management" subsystem (e.g. top administration, departmental managers).

To determine if the scales used in this study were consistent measures, alpha reliability scores were computed. Table 1 indicates that the reliability levels ranged from .941 to .747, with the majority of the scales having a reliability of .82 or greater. From these findings it was determined that the scales were reliable.

An analysis of the information scales (Table 2) indicated that hospital employees were presently receiving "some" to "little" information about task, human, and maintenance issues. For all three message types there was information uncertainty, with more uncertainty expressed in the areas of maintenance and human information than for task information.

Table 3 presents the results for the channels of communication and the sources of communication scales. All of the channels of communication showed considerable uncertainty except for "forms, notices, circulars, or pay check inserts." The items with the highest uncertainty indicated that employees

needed more information from scheduled communication encounters than they were receiving, especially committee or problem-solving meetings and scheduled one-to-one conferences. In addition, it was felt that there needed to be more information received through informal group meetings, staff meetings, and formal written reports.

Results for the sources of communication scale indicated considerable uncertainty for all the sources listed except "the grapevine" where employees felt they were getting more information than they needed. Responses also indicated that employees needed much more information from their immediate supervisor and departmental manager, and to a lesser degree they also needed more information from top administration and individuals in other units or departments.

Table 4 revealed that employees are moderately satisfied working in this organization. They show the greatest amount of satisfaction with their co-workers in the hospital, less satisfaction with their supervisors and the particular job they do in the hospital, and even less satisfaction with the organization as a whole and the rewards they get for working in this organization.

One of the variables of primary concern to this study was satisfaction and its relationship to information uncertainty and certain demographic factors. In an effort to better understand these relationships, correlations were computed (see Table 5). Overall satisfaction was discovered to be significantly correlated ($p.<01$) with all three types of information uncertainty (i.e. task, human, and maintenance), thus indicating that the greater the information uncertainty the less the satisfaction. Human messages (e.g. information regarding how employees are being evaluated, and chances for advancement), were found to be most highly correlated with overall satisfac-

tion. Older workers, males, and those who had been working for the hospital longer were more satisfied than younger workers, females, and those who had been working for the hospital a short time period.

To better understand these relationships, a stepwise multiple regression was carried out. The criterion variable was overall satisfaction and the predictor variables were task uncertainty, human uncertainty, maintenance uncertainty, education, age, sex, tenure, part-full time work, and level of supervision. Results indicated that these nine predictor variables explained 27% of the variance. The two variables that explained the greatest amount of the variance were human uncertainty (16.8%) and sex (6.4%). These findings may be interpreted to mean that the most dissatisfied individuals are those who do not receive human messages and those who are female.

Discussion

Since this paper reports the findings of only one hospital communication analysis, broad generalizations are not justified; however, there are a variety of observations and comparisons which do seem appropriate. This study revealed that task uncertainty was less than human or maintenance uncertainty, and in this respect the hospital did not appear to be different from other types of organizations. In a study using many of the same measures and procedures as the hospital analysis, Schaefer (1982) found a similar pattern in a manufacturing organization. In addition, eleven pilot studies employing the same information instrument in a variety of non-health care organizations found human uncertainty to be somewhat greater than maintenance uncertainty, with the least amount of uncertainty for task information. Human uncertainty was significantly greater than the other two in four of these pilots, and human and maintenance uncertainty were significantly greater than task uncertainty in two of the studies when tests of statistical difference were employed. These research findings are similar to those reported in the ICA

Communication Audit results which are based on the analysis of seventeen different types of organizations (Porter, 1979). Although the ICA Communication Audit "Receiving Information Scale" does not collapse items into task, human, and maintenance categories, the items exhibiting the greatest uncertainty on the ICA form (items 9, 10, & 6; see Porter, 1979), were in fact employed as maintenance and human items in the present study. It may be concluded, therefore, that the hospital employees investigated in this study appear to have the greatest uncertainty about the same kinds of topics as employees in other organizations.

The channels of communication results indicated that hospital employees need more information primarily from group meetings, and to a lesser degree they need more scheduled one-to-one conferences and written reports. These findings differ somewhat from the ICA Communication Audit results which indicate a greater need for one-to-one communication than group meetings. The biggest difference was for written communication where the ICA Communication Audit findings indicated workers felt they received too much written information, but hospital employees felt they needed more formal written reports. This difference in findings for written information might well be a function of the nature of hospital communication which is very dependent on the transmission of written messages since they are a more permanent record that can be transmitted to many different areas of the hospital system.

The findings for the sources of communication measure revealed that hospital personnel needed more information from their immediate supervisors and departmental managers as well as somewhat more information from top administration. These findings differ considerably from those of the ICA Communication Audit results which show almost no need for more information from the immediate supervisor. The results of the hospital analysis compare favorably,

however, with the ICA findings for the amount of information needed from departmental managers, and both the hospital results and ICA audit findings indicate that personnel receive too much information from the grapevine.

As Table 5 indicated, all three types of message uncertainty were significantly correlated to satisfaction, with the greatest correlation between human uncertainty and satisfaction. Additional multiple regression analysis indicated that human uncertainty was the best predictor of satisfaction. These results are similar to Moreno's bank audit (Moreno, 1982) and nearly identical to Schaefer's investigation of a manufacturing firm (Schaefer, 1982). Goodfellow (1969) reported the importance of human messages to employees morale in a hospital, while Goldhaber (1979, p. 128) noted that human messages appear to be more related to employee satisfaction and overall performance than other types of messages. Uncertainty, especially human uncertainty, appears to correlate with satisfaction regardless of the type of organization.

Although several demographic variables were correlated with satisfaction, sex appeared to be the most important since it was the second best predictor in the multiple regression. Moreno (1982) found similar correlations in her audit of a bank. In both the hospital analysis and Moreno's audit, females expressed significantly less satisfaction than males and were in lower levels of supervision (i.e. did not supervise anyone). It is interesting to note that Goldhaber (1979, p. 91), summarizing the findings of the ICA Communication Audit, reported that sex was not an important demographic variable except in banks and hospitals. Further investigation seems warranted.

This study has described the magnitude of and the relationships between hospital employees' perceived satisfaction and their perceived uncertainty. The nature of these relationships do not appear to be significantly different from similar perceptions of employees in other organizations. Although satis-

faction was correlated with sex, none of the other demographic variables appear to be related with satisfaction. Of the demographic variables that are descriptors of the organizational role relationships (i.e. tenure, part-full time, and level of supervision) only tenure is directly correlated to satisfaction. However, tenure did not explain any more of the variance than human uncertainty and sex in the multiple regression analysis. In other words, our research has yet to describe the influence of the organizational social structure on the correlations between uncertainty and satisfaction.

Further investigation of the influence of the organizational role relationships on these correlations should proceed to the macroscopic level with a careful analysis of the configuration of social relationships (i.e. the network). Although variables such as network role, correctedness, centrality, etc. should be considered, a most important consideration must be the activity of the various directions in a network of formal relationships. Longest (1975) has related upward communication to elements of uncertainty, and Washing (1978) has explained the importance of upward flows to morale. Hage (1974) had earlier demonstrated the importance of directional networks in describing the contingent nature of hospitals, and it seems that the diversity of hospital information environments cannot be adequately described without the consideration of these networks.

TABLE 1

Scales and Reliabilities

Scale	Items on Questionnaire	Alpha Reliability
Task Need	1, 2, 4, 7, 9, 12	.826
Task Now	19, 20, 22, 25, 27, 30	.865
Task Uncertainty	*	.747
Human Need	3, 10, 11, 14, 15, 17	.850
Human Now	21, 28, 29, 32, 33, 35	.825
Human Uncertainty	*	.839
Maintenance Need	5, 6, 8, 13, 16, 18	.835
Maintenance Now	23, 24, 26, 31, 34, 36	.841
Maintenance Uncertainty	*	.808
Channel Need	37 to 47	***
Channel Now	48 to 58	***
Channel Uncertainty	**	***
Source Need	59 to 65	***
Source Now	66 to 72	***
Source Uncertainty	**	***
Overall Satisfaction	73 to 98	.941
Satisfaction with Work	73, 78, 83, 88, 93	.784
Satisfaction with Co-workers	74, 79, 84, 89, 94, 97	.905
Satisfaction with the Organization	75, 80, 85, 90, 95, 98	.839
Satisfaction with Supervisor	76, 81, 86, 91, 96	.929
Satisfaction with Rewards	77, 82, 87, 92	.770

* The uncertainty score was obtained by subtracting the "need" score from the corresponding "now" score for each item on the scale. The scores from each item were then averaged to produce an overall uncertainty score ranging from -4 to +4.

** There was no overall channel uncertainty or source uncertainty score since each item was individually analyzed.

*** Reliability scores were not computed for the channel and source scales since these scales were analyzed item by item.

Table 2

Information Scale Results

	Mean Uncertainty Score *	Uncertainty Standard Deviation Score
I. Task Information[a]	- .493	.925
1. How to actually perform my job.	- .518	1.294
2. New ideas for my job.	- .893	1.304
4. The quality of work that is expected.	- .268	1.382
7. My job responsibilities.	- .054	1.530
9. How to handle exceptions or nonroutine matters.	- .848	1.459
12. The goals of my job.	- .375	1.370
II. Human Information[b]	- .612	1.158
3. Chances for advancement.	-1.161	1.522
10. Promotion and bonuses.	- .857	1.565
11. My salary or pay.	- .187	1.574
14. How well am I doing in my job.	- .589	1.647
15. Organizational benefits.	- .277	1.383
17. How am I being evaluated.	- .598	1.630
III. Maintenance Information[c]	- .616	1.030
5. Organizational successes and failures.	- .625	1.396
6. How organizational decisions are made that affect my job.	-1.143	1.476
8. Organizational goals and objectives.	- .500	1.288
13. Organizational lines of responsibility.	- .304	1.469
16. Organizational policies.	- .277	1.403
18. Organizational reward system.	- .848	1.606

* A negative uncertainty score indicates a lack of information. A positive uncertainty score indicates too much information. An uncertainty score approaching zero indicates employees are receiving the information they need. Uncertainty scores range from -4 to +4.

[a] The overall Task "need" mean score was 3.113 and Task "now" mean score was 2.620.

[b] The overall Human "need" mean score was 3.149 and Human "now" mean score was 2.537.

[c] The overall Maintenance "need" mean score was 3.165 and Maintenance "now" mean score was 2.549.

TABLE 3

Channels of Communication and
Sources of Communication Results

Scale	Mean Uncertainty Score *	Standard Deviation
Channels of Communication		
Formal written reports.	-.464	1.208
Memos or letters.	-.214	1.043
Scheduled one-to-one conferences.	-.598	1.270
Unscheduled one-to-one discussions.	-.321	1.164
Forms, notices, circulars, or pay check inserts.	+.009	1.000
Staff meetings.	-.455	1.287
Committees or problem-solving meetings.	-.830	1.451
Informal group meetings.	-.491	1.238
Telephone.	-.170	.889
Bulletin Board.	-.277	.862
Newsletters.	-.384	.979
Sources of Communication		
Subordinates.	-.304	1.081
Co-workers in my own unit.	-.286	.821
Individuals in other units or departments.	-.420	1.001
My immediate supervisor.	-.571	1.221
My department manager.	-.554	1.169
Top management (administrators).	-.482	1.107
The grapevine.	+.348	1.438

* A negative uncertainty score indicates employees want more information from that channel or source. A positive uncertainty score indicates employees want less information from that channel or source. An uncertainty score approaching zero indicates employees are receiving the information they need from that channel or source. Uncertainty scores range from -4 to +4.

Table 4

Satisfaction Results

	Mean*	Standard Deviation
I. Overall Satisfaction (items 73 to 98)	3.399	.677
II. Satisfaction with Work (items 73, 78, 83, 88, 93)	3.505	.769
73. The working conditions are good.	3.241	1.084
78. My job duties are basically what I expected.	3.607	.914
83. I feel free to express my opinion on matters concerning my job.	3.571	1.160
88. I feel free to make my own decisions about carrying out my job.	3.607	1.085
93. My job duties are clearly defined.	3.500	.986
III. Satisfaction with Co-workers (items 74, 79, 84, 89, 94, 97)	3.753	.767
74. My co-workers are easy to get to know.	3.902	.920
79. My co-workers are friendly.	3.938	.942
84. My co-workers respect differences of opinion.	3.545	.948
89. My co-workers are cooperative.	3.750	.954
94. I trust my co-workers.	3.625	.969
97. My relationships with co-workers are satisfying.	3.759	.852
VI. Satisfaction with the Organization (items 75, 80, 85, 90, 95, 98)	3.061	.759
75. My organization recognizes and rewards competent/outstanding performance.	2.625	1.116
80. Compared to other organizations, I like the way things are done in this organization.	3.170	1.039
85. The organizational rules and procedures are clear and easy to understand.	3.304	.966
90. Red tape is kept to a minimum.	3.196	.899
95. My organization is concerned about its members' welfare.	3.187	.964
98. I am satisfied with the way decisions are made in this organization.	2.884	1.113
V. Satisfaction with Supervisor (items 76, 81, 86, 91, 96)	3.575	1.041
76. I trust my immediate supervisor.	3.714	1.166
81. I can tell my immediate supervisor when things are going wrong.	3.652	1.206
86. My relationship with my immediate supervisor is satisfying.	3.625	1.132
91. My immediate supervisor is friendly with his/her subordinates.	3.679	1.117
96. My immediate supervisor praises my for a good job.	3.205	1.267
VI. Satisfaction with Rewards (items 77, 82, 87, 92)	3.020	.903
77. My salary or pay is good.	2.857	1.184
82. Organizational benefits (such as insurance or vacation) are good.	3.491	1.155
87. Promotion and advancement opportunities are good.	2.652	1.152
92. Training opportunities or courses are available.	3.080	1.202

* The satisfaction scores range from 5 (high satisfaction) to 1 (low satisfaction).

TABLE 5

Correlation Matrix

	Satisfaction	Task Uncertainty	Human Uncertainty	Maintenance Uncertainty	Education	Age	Sex**	Tenure	Part-Full Time***
Task Uncertainty	.277 *								
Human Uncertainty	.410 *	.638 *							
Maintenance Uncertainty	.277 *	.757 *	.763*						
Education	-.053	-.128	-.100	-.158					
Age	.203 *	.048	.189*	.172	-.350 *				
Sex**	-.201 *	.054	.121	.110	-.310 *	.082			
Tenure	.258 *	.149	.301*	.302 *	-.352 *	.538*	.100		
Part-Full Time ***	.004	.006	.034	-.049	.045	-.142	-.003	-.151	
Level of Supervision	.178	-.002	.180	.118	.448 *	.122	-.323 *	.130	-.180

* $p < .05$, $r = .184$; $p < .01$, $r = .241$

** 1 = male, 2 = female

*** 1 = full time, 2 = part time

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APPENDIX

PART 1

Communication Analysis Questionnaire

INSTRUCTIONS

The purpose of this questionnaire is to determine the opinions of hospital personnel concerning internal communication in your organization.

On this questionnaire you will answer questions concerning the amount of information you receive as well as your opinion on certain issues. In answering the questions concerning the amount of information received, use the following scale in making your responses:

1 - Very little or no information
2 - Little information
3 - Some information
4 - Much information
5 - Very much information

In answering the questions concerning your opinion on certain issues, use the following scale in making your responses:

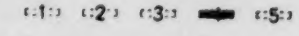
1 - Strongly disagree
2 - Disagree
3 - Neutral or Does Not Apply
4 - Agree
5 - Strongly agree

For the first part of the questionnaire (item 1 to item 98), please do not write on the questionnaire sheet but make all your responses on the Scan-Tron answer sheet. Using the enclosed pencil, darken in either space 1, 2, 3, 4, or 5 on the Scan-Tron answer sheet. Please make only one response per item, selecting the one which you feel is closest to your opinon about that matter.

For example, an item on the questionnaire might be:

1 2 3 4 5 How much information do you receive by telephone?

If you feel you get "much information" over the telephone, you would darken in response "4" on the Scan-Tron answer sheet in the following manner:



If you feel that an item on the questionnaire is not applicable to you, answer that item with a "3" response.

Be assured that your answers are completely confidential.

INFORMATION NEEDS

All work requires some information. How much information do you need to perform your job? Below is a list of eighteen topics. Please indicate the amount of information you need to perform your job well. Use the following scale:

1. Very little or no information
2. Little information
3. Some information
4. Much information
5. Very much information

For each item, mark the appropriate response on your scan-tron answer sheet.

This is the amount of information I need		About
1.	1 2 3 4 5	How to actually perform my job.
2.	1 2 3 4 5	New ideas for my job.
3.	1 2 3 4 5	Chances for advancement.
4.	1 2 3 4 5	The quality of work that is expected.
5.	1 2 3 4 5	Organizational successes and failures.
6.	1 2 3 4 5	How organizational decisions are made that affect my job.
7.	1 2 3 4 5	My job responsibilities.
8.	1 2 3 4 5	Organizational goals and objectives.
9.	1 2 3 4 5	How to handle exceptions or nonroutine matters.
10.	1 2 3 4 5	Promotion and bonuses.
11.	1 2 3 4 5	My salary or pay.
12.	1 2 3 4 5	The goals of my job.
13.	1 2 3 4 5	Organizational lines of responsibility.
14.	1 2 3 4 5	How well am I doing in my job.
15.	1 2 3 4 5	Organizational benefits.
16.	1 2 3 4 5	Organizational policies.
17.	1 2 3 4 5	How am I being evaluated.
18.	1 2 3 4 5	Organizational reward system.

RECEIVING INFORMATION

Your organization supplies you with information in various ways. You have face-to-face communication, the telephone, written communication, etc. How much information do you receive from the organization and its members (employees)? Below is a list of eighteen topics. Please indicate the amount of information you are currently receiving about these topics. Use the following scale:

1. Very little or no information
2. Little information
3. Some information
4. Much information
5. Very much information

For each item, mark the appropriate response on your scan-tron answer sheet.

This is the amount of information I currently receive		About
19.	1 2 3 4 5	How to actually perform my job.
20.	1 2 3 4 5	New ideas for my job.
21.	1 2 3 4 5	Chances for advancement.
22.	1 2 3 4 5	The quality of work that is expected.
23.	1 2 3 4 5	Organizational successes and failures.
24.	1 2 3 4 5	How organizational decisions are made that affect my job.
25.	1 2 3 4 5	My job responsibilities.
26.	1 2 3 4 5	Organizational goals and objectives.
27.	1 2 3 4 5	How to handle exceptions or nonroutine matters
28.	1 2 3 4 5	Promotion and bonuses.
29.	1 2 3 4 5	My salary or pay.
30.	1 2 3 4 5	The goals of my job.
31.	1 2 3 4 5	Organizational lines of responsibility.
32.	1 2 3 4 5	How well am I doing in my job.
33.	1 2 3 4 5	Organizational benefits.
34.	1 2 3 4 5	Organizational policies.
35.	1 2 3 4 5	How am I being evaluated.
36.	1 2 3 4 5	Organizational reward system.

CHANNEL NEEDS

You receive information in various ways. Below is a list of several methods of communicating. How much information do you need from these methods of communication to perform your job? Please use the following scale:

1. Very little or no information
2. Little information
3. Some information
4. Much information
5. Very much information

For each item, mark the appropriate response on your scan-tron answer sheet.

This is the amount of information I need		From
37.	1 2 3 4 5	Formal written reports.
38.	1 2 3 4 5	Memos or letters.
39.	1 2 3 4 5	Scheduled one-to-one conferences.
40.	1 2 3 4 5	Unscheduled one-to-one discussions.
41.	1 2 3 4 5	Forms, notices, circulars, or pay check inserts.
42.	1 2 3 4 5	Staff meetings.
43.	1 2 3 4 5	Committees or problem-solving meetings.
44.	1 2 3 4 5	Informal group meetings.
45.	1 2 3 4 5	Telephone.
46.	1 2 3 4 5	Bulletin boards.
47.	1 2 3 4 5	Newsletters.

RECEIVING THROUGH CHANNELS

You receive information in various ways. Below is a list of several methods of receiving information. How much information do you now receive from each of these methods of communication? Use the following scale:

1. Very little or no information
2. Little information
3. Some information
4. Much information
5. Very much information

For each item, mark the appropriate response on your scan-tron answer sheet.

This is the amount of information I receive now		From
48.	1 2 3 4 5	Formal written reports.
49.	1 2 3 4 5	Memos or letters.
50.	1 2 3 4 5	Scheduled one-to-one conferences.
51.	1 2 3 4 5	Unscheduled one-to-one discussions.
52.	1 2 3 4 5	Forms, notices, circulars, or pay check inserts.
53.	1 2 3 4 5	Staff meetings.
54.	1 2 3 4 5	Committees or problem-solving meetings.
55.	1 2 3 4 5	Informal group meetings.
56.	1 2 3 4 5	Telephone.
57.	1 2 3 4 5	Bulletin boards.
58.	1 2 3 4 5	Newsletters.

SOURCE NEEDS

You receive information from various sources. Below is a list of several sources. How much information do you need to receive from these sources? Use the following scale?

1. Very little or no information
2. Little information
3. Some information
4. Much information
5. Very much information

For each item, mark the appropriate response on your scan-tron answer sheet.

This is the amount of information I need to receive		From
59.	1 2 3 4 5	Subordinates
60.	1 2 3 4 5	Co-workers in my own unit.
61.	1 2 3 4 5	Individuals in other units or departments.
62.	1 2 3 4 5	My immediate supervisor.
63.	1 2 3 4 5	My department manager.
64.	1 2 3 4 5	Top management (administrators)
65.	1 2 3 4 5	The grapevine.

RECEIVING FROM SOURCES

You receive information from various sources. Below is a list of several sources. How much information are you currently receiving from these sources? Use the following scale:

1. Very little or no information
2. Little information
3. Some information
4. Much information
5. Very much information

For each item, mark the appropriate response on your scan-tron answer sheet.

This is the amount of information I am now receiving		From
66.	1 2 3 4 5	Subordinates
67.	1 2 3 4 5	Co-workers in my own unit.
68.	1 2 3 4 5	Individuals in other units or departments.
69.	1 2 3 4 5	My immediate supervisor.
70.	1 2 3 4 5	My department manager.
71.	1 2 3 4 5	Top management (administrators).
72.	1 2 3 4 5	The grapevine.

Opinion Form

Please give your opinion on each of the following items. Indicate the extent to which you agree or disagree based on the following scale.

Strongly Agree (SA) = 5
Agree (A) = 4
Neutral (N) = 3
Disagree (D) = 2
Strongly Disagree(SD) = 1

For each item, mark the appropriate response on the scan-tron answer sheet.

		SD	D	N	A	SA
73.	The working conditions are good.	1	2	3	4	5
74.	My co-workers are easy to get to know.	1	2	3	4	5
75.	My organization recognizes and rewards competent/outstanding performance.	1	2	3	4	5
76.	I trust my immediate supervisor.	1	2	3	4	5
77.	My salary or pay is good.	1	2	3	4	5
78.	My job duties are basically what I expected.	1	2	3	4	5
79.	My co-workers are friendly.	1	2	3	4	5
80.	Compared to other organizations, I like the way things are done in this organization.	1	2	3	4	5
81.	I can tell my immediate supervisor when things are going wrong.	1	2	3	4	5
82.	Organizational benefits (such as insurance or vacation) are good.	1	2	3	4	5
83.	I feel free to express my opinion on matters concerning my job.	1	2	3	4	5
84.	My co-workers respect differences of opinion.	1	2	3	4	5
85.	The organizational rules and procedures are clear and easy to understand.	1	2	3	4	5
86.	My relationship with my immediate supervisor is satisfying.	1	2	3	4	5
87.	Promotion and advancement opportunities are good.	1	2	3	4	5
88.	I feel free to make my own decisions about carrying out my job.	1	2	3	4	5
89.	My co-workers are cooperative.	1	2	3	4	5
90.	Red tape is kept to a minimum.	1	2	3	4	5
91.	My immediate supervisor is friendly with his/her subordinates.	1	2	3	4	5
92.	Training opportunities or courses are available.	1	2	3	4	5
93.	My job duties are clearly defined.	1	2	3	4	5
94.	I trust my co-workers.	1	2	3	4	5
95.	My organization is concerned about its members' welfare.	1	2	3	4	5
96.	My immediate supervisor praises me for a good job.	1	2	3	4	5
97.	My relationships with co-workers are satisfying.	1	2	3	4	5
98.	I am satisfied with the way decisions are made in this organization.	1	2	3	4	5

PART 2

The second part of the questionnaire consists of a "Demographics Sheet" and a "Communication Networks" form. For each of the items on the second part of the questionnaire, mark all your responses on the questionnaire. (You do not use the Scan-tron answer sheet on this part of the questionnaire.)

DEMOGRAPHICS SHEET

For each of the following items, either circle the correct response or fill in the blank with the appropriate response. Respond to all items on this sheet.

1. What is your sex?
   A. Male
   B. Female

2. Do you work:
   A. Full Time
   B. Part Time

3. What department or unit do you work in?

4. What is your official position or job title in the hospital?

5. How long have you worked in this organization?
   _____year(s) _____month(s)

6. What is the last level you completed in school?
   A. Less than high school graduate.
   B. High school graduate
   C. Some college work or technical school.
   D. Undergraduate college degree (4 year institution)
   E. Some graduate work beyond the bachelor's degree.
   F. Graduate degree (i. e. master's degree)
   G. Graduate work beyond the master's degree.
   H. Other_____.

7. What is your age?
   A. Under 20 years of age
   B. 21 to 25 years of age
   C. 26 to 30 years of age
   D. 31 to 35 years of age
   E. 36 to 40 years of age
   F. 41 to 45 years of age
   G. 46 to 50 years of age
   H. 51 to 55 years of age
   I. 56 to 60 years of age
   J. Over 60 years of age